Recent Design Upgrades of The APS Beamline Standard Components
(A Brief)

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APS TWG
March 15, 2001

ADVANCED PHOTON SOURCE

OUTLINE

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Introduction

- In 1990, at the start of the Advanced Photon Source (APS) front-end component development, the APS Experimental Facilities Division initiated a design standardization and modularization activity for the APS beamline components.
- During the past ten years, the APS standard components, which were based on the APS front-end development experiences, passed through many design reviews, prototype R&D activities, and mass production processes.
- By now, hundreds of different beamline standard components, as well as many subcomponents, have been installed and operational in APS beamlines, and more than 5000 detailed AutoCAD drawings have been released to the APS design exchange system, which is accessible by the APS Collaborate Access Teams (CATs).

Introduction

- During the last five years, based on the operation experiences, many upgrades have been made for the beamline standard components to continue improving beamline performance and reliability. In this presentation, the particular design upgrades, as well as the new component design specifications, for APS beamline standard components are briefly summarized.

White Beam Slits

- **L5-810000-02**
  - upgraded white beam grazing-incidence knife-edge slits for 2-ID-A

- **L5-920000-05**
  - upgraded white beam slits for 3-ID-A

Integral Shutters

- **P4-30**
  - Integral undulator white beam shutters for 4-ID-A (34 m from the source)
- **P4-40**
  - Integral undulator white beam shutters for 4-ID-B (61 m from the source)
- **P4-50**
  - Integral undulator white beam shutters for 32-ID-A (30 m from the source)
- **P4-60**
  - Integral undulator white beam stops for 4-ID-B (55 m from the source)
- **P8-81**
  - Integral monochromatic beam shutters for 5-BM (104 mm (V) x 60 mm (H))

White Beam Splitter and collimator

- **M7-41**
  - Undulator white beam splitter for 4-ID-A (29 m from the source)
- **M7-42**
  - Undulator white beam collimator for 3-ID-A x-ray lenses (27 m from the source)
- **K5-20**
  - Heavy-metal in-vacuum Bremsstrahlung collimator

White Beam Windows

- **W1-82**
  - Undulator white beam window for 1-ID-A (25 m from the source)
    - » Single polished 500 µm Be-window with 2.6 mm (V) x 3.6 mm (H) aperture
    - » Protected by M4-40 white beam mask with 2.0 mm (V) x 3.0 mm (H) aperture
    - » Tested with APS 100 mA white beam from double undulator A with Gap = 11 mm
- **W1-74***
  - Undulator white/mono. beam window for 4-ID-B (57 m from the source)
    - » Single polished 150 µm Be-window with 60 mm (V) x 12 mm (H) aperture
    - » White beam zone protected by a 3.25-mm-thick Be-filter

* will be installed in April 2001.

Supporting Tables

- **T6-47**
  - Optical table for experimental station
    - » Table top size 1524 mm x 914 mm
    - » Load capacity: 750 kg
    - » Vertical manual adjustment: +/- 88 mm
    - » Vertical motion: +/- 25 mm
    - » Horizontal motion: +/- 75 mm
    - » Motion resolution: 2 µm (V), 5 µm (H)
    - » Motion repeatability: < 10 µm (V), < 20 µm (H)
    - » Vertical motion straightness of trajectory: 200 µrad per 25 mm

Supporting Tables

- **T6-51**
  - Supporting table for horizontal deflecting mirror (32-ID)
    - » Load capacity: 1000 kg
    - » Vertical motion: +/- 50 mm
    - » Horizontal motion: +/- 12.5 mm
    - » Angular motion: +/- 0.9^{o}
    - » Angular resolution: 0.25 µrad
    - » Motion resolution: 2 µm (V), 5 µm (H)
    - » Motion repeatability: < 10 µm (V), < 20 µm (H)

White Beam Hatches and Transport

- **Hj-31-90**
  - White beam hutch for 4-ID-A (Template)
- **Hj-34-90**
  - White beam hutch for 4-ID-D (Template)
- **Hk-31**
  - White beam hutch for 32-ID-A
- **Hk-32**
  - White beam hutch for 32-ID-B
- **U1-40**
  - White beam transport (2.5” I.d.)
- **U1-60**
  - White beam transport (6” I.d.)

Selected List of New Designs (Construction in progress)

- **P4-70**
  - Integral undulator white beam shutters for 1-ID-A
    - » 21 mm - 35 mm variable monochromatic beam vertical offset
- **P5-70**
  - Integral undulator white beam shutters for 1-ID-B
    - » 21 mm - 35 mm variable monochromatic beam vertical offset
- **P8-70**
  - Integral undulator mono. beam shutters for 8-ID-D
- **L5-70**
  - Undulator white beam slits for APS double UA with 120 mA operation
- **L2-70**
  - Undulator mono. beam slits/XBPM for 4-ID-D

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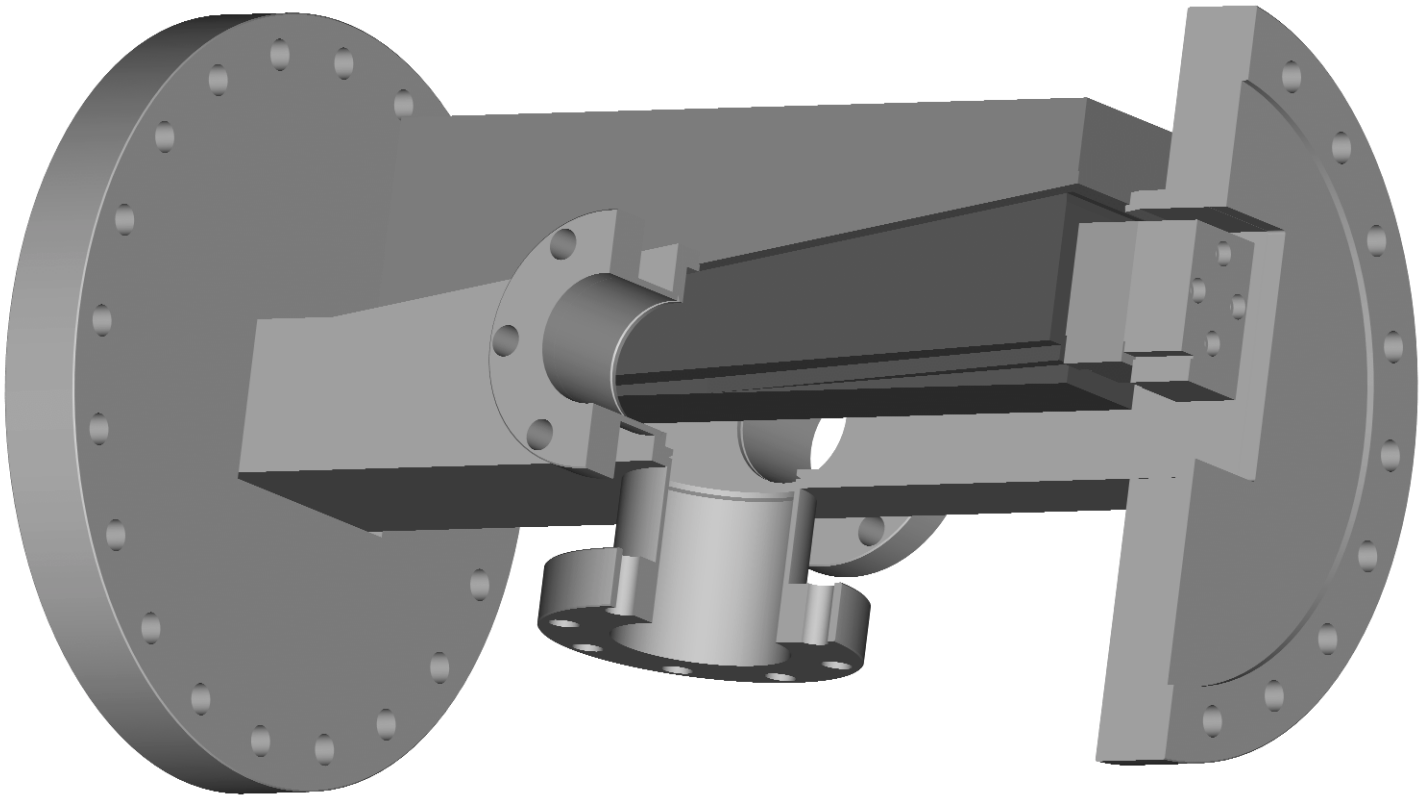

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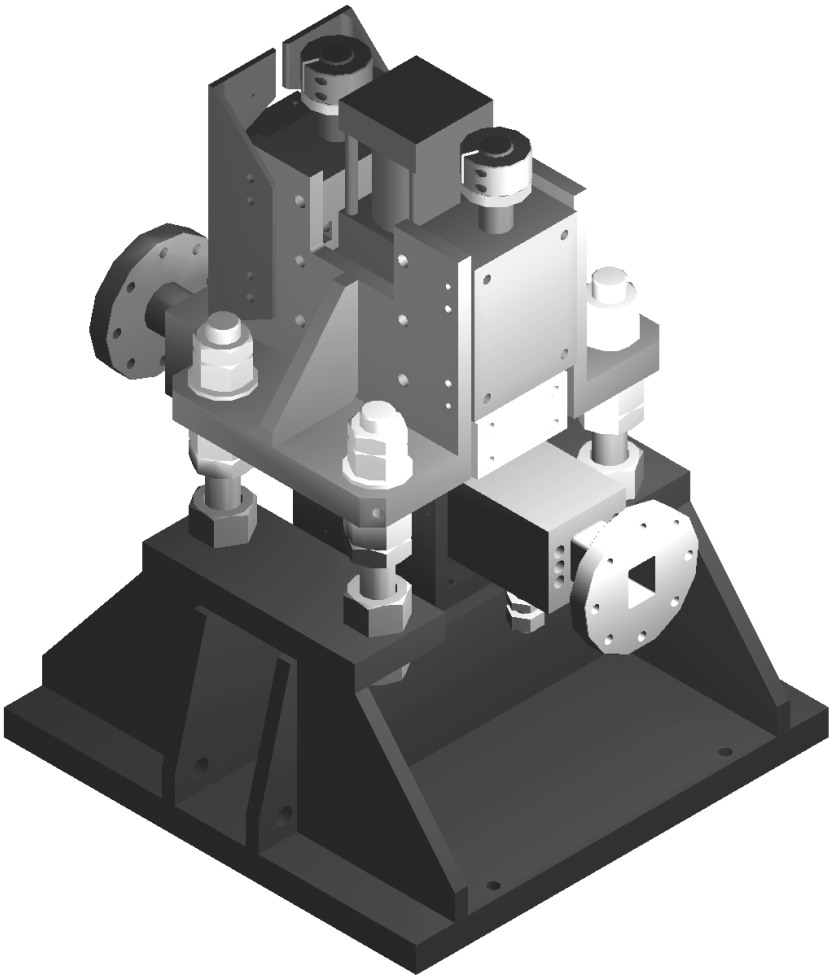

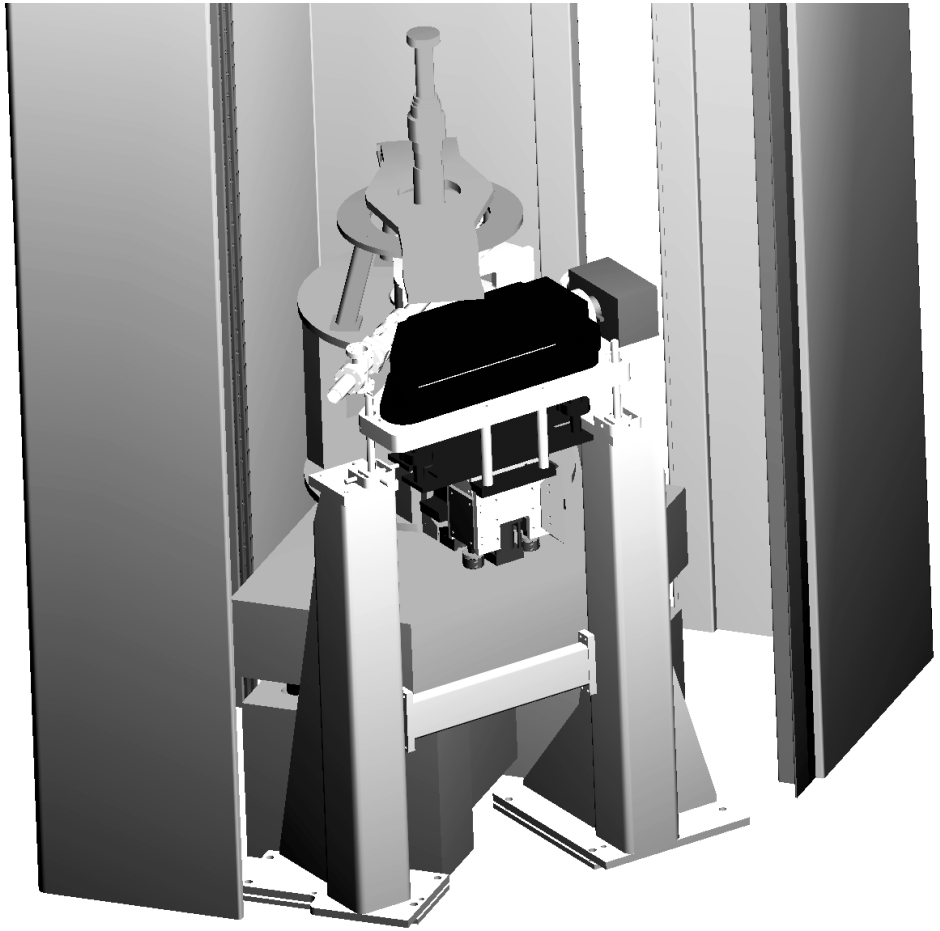

Acknowledgements

- We acknowledge help from George Srajer, Jonathan Lang, John Freeland, Ian McNulty, Barry Lai, Ercan Alp, Kevin D'Amico, John Quintana, Laurence Lurio of the APS. We would also like to express our appreciation to the staff members (Juan Barraza, Joeseph Chang, Frank Carrera, Jeff Collins, and David Ryding) of the original APS beamline engineering group, headed by Dr. Tuncer Kuzay for their design and development effort. This work was supported by the U.S. Department of Energy, Office of Science, under Contract No. W-31-109-Eng-38.